$\therefore z^3+(G/F+K/E+H/D)z^2+(GK/EF+GH/DF+HK)DE)z+GHK/DEF=0.$

$\therefore (z+G/F)(z+K/E)(z+H/D)=0.$

$\therefore$ The roots are $-G/F$, $-K/E$, $-H/D$, or

$$\frac{2\gamma-\alpha-\beta}{2\alpha\beta-\gamma\alpha-\gamma\beta}, \quad \frac{2\beta-\alpha-\gamma}{2\gamma\alpha-\beta\gamma-\beta\alpha}, \quad \frac{2\alpha-\beta-\gamma}{2\beta\gamma-\alpha\beta-\alpha\gamma}.$$

PROBLEMS FOR SOLUTION.

ALGEBRA.

185. Proposed by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

Without introducing radicals, eliminate x and y from the equations

$$ax^2+bx+c=0,\ ay^2+by+d=0,\ ax^2y^2+bxy+e=0.$$

186. Proposed by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

Eliminate x and y from the equations

$$ax^3+bx^2+cx+d=0,$$
$$ay^3+by^2+cy+e=0,$$
$$ax^3y^3+bx^2y^2+cxy+f=0,$$

the eliminant to be rational in d, e, f.

GEOMETRY.

207. Proposed by W. W. HART, University High School, Chicago, Ill.

According to Gauss the circumference of a circle can be divided into n equal parts by ruler and compass when and only when n is a prime of the form $2^{2^x}+1$.

The following construction gives good partial results for n equals *any* integer. If AB is the diameter of the circle, and C is the vertex of the equilateral triangle ABC, and if D is a point on AB at the distance $2AB/n$ from A, then draw the line CD cutting the circle at E and F; E being the more remote from C. $AE=1/n$ circumference approximately. For low values of n this method is very practical; is it practical in general? How great is the error?

208. Proposed by W. J. GREENSTREET, A. M., Editor of The Mathematical Gazette, Stroud, England.

Tangents drawn to two confocal parabolae from a point on the common tangent intersect at the same angle as the axes of the parabolae.